

IEEE C95.1
KDB 447498 D03
47 C.F.R. Part 1, Subpart I, Section 1.1310
47 C.F.R. Part 2, Subpart J, Section 2.1091

RF EXPOSURE REPORT

For

Data Collection Computer

Model: CV31A

Trade Name: Honeywell

Issued to

Honeywell International Inc
9680 Old Bailes Rd Fort Mill SC United States 29707

Issued by

Compliance Certification Services Inc.

**No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City 24891, Taiwan. (R.O.C.)**

<http://www.ccsrf.com>

service@ccsrf.com

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Testing Laboratory
1309

Revision History

| Rev. | Issue Date | Revisions | Effect Page | Revised By |
|------|------------|---------------|-------------|-------------|
| 00 | 2014/05/24 | Initial Issue | ALL | Angel Cheng |
| 01 | 2015/12/21 | Rev. (01) | ALL | Doris Chu |

Rev. (01)

1. Applicant updates standard.
2. Other information, please refer to the T140430W01 and this test report.

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1. LIMIT

According to §15.247(i), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this chapter.

2. EUT SPECIFICATION

| | | | |
|-------------------------------------|--|--|--|
| EUT | Data Collection Computer | | |
| Model | CV31A | | |
| Trade Name | Honeywell | | |
| Frequency band (Operating) | <input checked="" type="checkbox"/> Bluetooth 2.1 + EDR / 4.0: 2402 ~ 2480 MHz 802.11b/g/n HT20: 2412MHz ~ 2462MHz 802.11a: 5180 ~ 5700MHz / 5745 ~ 5825MHz 802.11 HT20: 5180 ~ 5700MHz / 5745 ~ 5825MHz <input type="checkbox"/> Others | | |
| Device category | <input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others | | |
| Exposure classification | <input type="checkbox"/> Occupational/Controlled exposure ($S = 5\text{mW/cm}^2$) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure ($S=1\text{mW/cm}^2$) | | |
| Antenna Specification | 5GHz: Antenna Gain : 5.00 dBi (Numeric gain 3.16) 2.4GHz: Antenna Gain : 3.00 dBi (Numeric gain 2.00) | | |
| Maximum Average output power | Bluetooth Mode : 6.92 dBm (4.920 mW) IEEE 802.11b Mode: 18.73 dBm (74.645 mW) IEEE 802.11g Mode: 14.55 dBm (28.510 mW) IEEE 802.11n HT 20 Mode: 14.45 dBm (27.861 mW) IEEE 802.11a Mode: 14.41 dBm (27.606 mW) IEEE 802.11n HT20 Mode: 14.38 dBm (27.416 mW) | | |
| Maximum Tune up Power | Bluetooth Mode : 8.50 dBm (7.079 mW) IEEE 802.11b Mode: 20.00 dBm (100.000 mW) IEEE 802.11g Mode: 16.00 dBm (39.811 mW) IEEE 802.11n HT 20 Mode: 16.00 dBm (39.811 mW) IEEE 802.11a Mode: 16.00 dBm (39.811 mW) IEEE 802.11n HT20 Mode: 16.00 dBm (39.811 mW) | | |
| Evaluation applied | <input checked="" type="checkbox"/> MPE Evaluation* <input type="checkbox"/> SAR Evaluation <input type="checkbox"/> N/A | | |

3. TEST RESULTS

No non-compliance noted.

Calculation

Given $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{377}$

Where E = Field strength in Volts / meter

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{377d^2}$$

Changing to units of mW and cm, using:

P (mW) = P (W) / 1000 and

d (cm) = d (m) / 100

Yields

$$S = \frac{30 \times (P/1000) \times G}{377 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2} \quad \text{Equation 1}$$

Where d = Distance in cm

P = Power in mW

G = Numeric antenna gain

S = Power density in mW / cm^2

4. MAXIMUM PERMISSIBLE EXPOSURE

Substituting the MPE safe distance using $d = 20$ cm into Equation 1:

$$S = 0.000199 \times P \times G$$

Where $P = \text{Power in mW}$

$G = \text{Numeric antenna gain}$

$S = \text{Power density in mW / cm}^2$

Bluetooth mode:

| Ch. | Frq.(MHz) | P (mW) | Gain (num.) | D (cm) | Power density in mW / cm ² | Limit (mW/cm ²) |
|-----|-----------|--------|-------------|--------|---------------------------------------|-----------------------------|
| 0 | 2402 | 7.079 | 2 | 20 | 0.0028 | 1 |

IEEE 802.11b mode:

| Ch. | Frq.(MHz) | P (mW) | Gain (num.) | D (cm) | Power density in mW / cm ² | Limit (mW/cm ²) |
|-----|-----------|---------|-------------|--------|---------------------------------------|-----------------------------|
| 1 | 2412 | 100.000 | 2 | 20 | 0.0398 | 1 |

IEEE 802.11g mode:

| Ch. | Frq.(MHz) | P (mW) | Gain (num.) | D (cm) | Power density in mW / cm ² | Limit (mW/cm ²) |
|-----|-----------|--------|-------------|--------|---------------------------------------|-----------------------------|
| 1 | 2412 | 39.811 | 2 | 20 | 0.0158 | 1 |

IEEE 802.11n HT20 mode:

| Ch. | Frq.(MHz) | P (mW) | Gain (num.) | D (cm) | Power density in mW / cm ² | Limit (mW/cm ²) |
|-----|-----------|--------|-------------|--------|---------------------------------------|-----------------------------|
| 1 | 2412 | 39.811 | 2 | 20 | 0.0158 | 1 |

IEEE 802.11a mode:

| Ch. | Frq.(MHz) | P (mW) | Gain (num.) | D (cm) | Power density in mW / cm ² | Limit (mW/cm ²) |
|-----|-----------|--------|-------------|--------|---------------------------------------|-----------------------------|
| 140 | 5700 | 39.811 | 3.16 | 20 | 0.0250 | 1 |

IEEE 802.11a HT20 mode:

| Ch. | Frq.(MHz) | P (mW) | Gain (num.) | D (cm) | Power density in mW / cm ² | Limit (mW/cm ²) |
|-----|-----------|--------|-------------|--------|---------------------------------------|-----------------------------|
| 140 | 5700 | 39.811 | 3.16 | 20 | 0.0250 | 1 |